Amendment to the Claims

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims

1. (Currently Amended) A diffusion-based method for detecting the activity of a bio/chemical species in the presence of a reactive constituent, the method comprising:

supplying a bio/chemical species to a finite volume diffusion channel, the finite volume diffusion channel comprising a longitudinal transport axis, a first measurement probe positioned at a first location along the longitudinal transport axis, and a second measurement probe positioned at a second location along the longitudinal transport axis;

depositing ~~[supplying]~~ a reactive constituent ~~[to]~~ in the finite volume diffusion channel at a stationary position between the first measurement probe and the second measurement probe, wherein the reactive constituent is in fluid communication with the bio/chemical species along the longitudinal transport axis and is known or suspected of being reactive to the bio/chemical species;

obtaining a differential measurement between the first and second measurement probes, wherein said obtained differential measurement ~~[characterizes]~~ corresponds to a diffusion response occurring between the bio/chemical species and the reactive constituent along the transport axis and between the first and second measurement probes; and

correlating ~~[the]~~ said obtained differential measurement ~~corresponding to the measured diffusion response~~ to a predefined differential measurement corresponding to a baseline diffusion response to determine the presence of absence of activity of the bio/chemical species in the presence of the reactive constituent.

2. (Original) The method of claim 1, wherein supplying a bio/chemical species to the finite volume diffusion channel comprises supplying a first concentration of the bio/chemical species to the finite volume diffusion channel, and wherein supplying a

reactive constituent comprises supplying a second concentration of the bio/chemical species to the finite volume diffusion channel.

3. (Original) The method of claim 1, wherein supplying a bio/chemical species to the diffusion channel comprises supplying a population of cells to the finite volume diffusion channel, and wherein supplying a reactive constituent comprises supplying an ionic species to the finite volume diffusion channel.

4. (Original) The method of claim 1, wherein supplying a bio/chemical species to the diffusion channel comprises supplying a population of cells to the finite volume diffusion channel, and wherein supplying a reactive constituent comprises supplying small molecules intended for therapeutic purposes to the finite volume diffusion channel.

Claims 5-7 are canceled.

8. (Currently Amended) A diffusion-based method for detecting the activity of a bio/chemical species in the presence of a reactive constituent, the method comprising:

supplying a ~~[the]~~ bio/chemical species to a finite volume diffusion channel, the finite volume diffusion channel comprising a longitudinal transport axis, a first measurement probe positioned at a first location along the longitudinal transport axis, and a second measurement probe positioned at a second location along the longitudinal transport axis;

depositing ~~[supplying]~~ a reactive constituent ~~[to]~~ in the finite volume diffusion channel at a stationary position between the first measurement probe and the second measurement probe, wherein the reactive constituent is in fluid communication with the bio/chemical species along the longitudinal transport axis and is known or suspected of being reactive to the bio/chemical species;

obtaining a differential measurement between the first and second measurement probes, wherein said obtained differential measurement ~~[characterizes]~~ corresponds to a diffusion response occurring between the bio/chemical species and the reactive

constituent along the transport axis and between the first and second measurement probes, said ~~[measured]~~ obtained diffusion response indicative of the rate of activity of the bio/chemical species in the presence of the reactive constituent; and

correlating ~~[the]~~ said obtained differential measurement ~~corresponding to the measured diffusion response~~ to a predefined differential measurement corresponding to a baseline diffusion response to determine the rate of activity of the bio/chemical species in the presence of the reactive constituent.

Claims 9-10 are canceled.

11. (Original) The method of claim 8, wherein supplying a bio/chemical species to the diffusion channel comprises supplying a population of cells to the finite volume diffusion channel, and wherein supplying a reactive constituent comprises supplying an ionic species to the finite volume diffusion channel.

12. (Original) The method of claim 8, wherein supplying a bio/chemical species to the diffusion channel comprises supplying a population of cells to the finite volume diffusion channel, and wherein supplying a reactive constituent comprises supplying small molecules intended for therapeutic purposes to the finite volume diffusion channel.

13. (Canceled).

14. (New) A system for detecting the activity of a bio/chemical species in the presence of a reactive constituent, the system comprising:

a finite volume diffusion channel comprising a longitudinal transport axis, a first measurement probe positioned at a first location along the longitudinal transport axis, and a second measurement probe positioned at a second location along the longitudinal transport axis;

a reactive constituent deposited in the finite volume diffusion channel at a stationary position between the first measurement probe and the second measurement

probe, wherein the reactive constituent is positioned to be in fluid communication with a supplied bio/chemical species along the longitudinal transport axis and is known or suspected of being reactive to the supplied bio/chemical species;

means for obtaining a differential measurement between the first and second measurement probes, wherein said obtained differential measurement corresponds to a diffusion response occurring between the bio/chemical species and the reactive constituent along the transport axis and between the first and second measurement probes; and

means for correlating said obtained differential measurement to a predefined differential measurement corresponding to a baseline diffusion response to determine the presence of absence of activity of the bio/chemical species in the presence of the reactive constituent.

15. (New) The system of claim 14, wherein the finite volume diffusion channel comprises a micro-fluidic channel.

16. (New) The system of claim 15, wherein the microfluidic channel is formed within an integrated circuit.

17. (New) The system of claim 14, wherein the means for obtaining a differential measurement is selected from the group consisting of electrical means and optical means.

18. (New) The system of claim 14, wherein the system is constructed as system selected from the group consisting of a micro-electromechanical (MEM) system and a microfluidic system.

19. (New) The system of claim 14, wherein the finite volume diffusion channel includes a cavity operable to retain the reactive constituent.

20. (New) The system of claim 14, wherein the reactive constituent comprises beads.

21. (New) The system of claim 14, wherein the finite volume diffusion channel comprises a plurality of cavities for retaining a respective plurality of reactive constituents.

22. (New) The system of claim 14, wherein the finite volume diffusion channel is integrated with the means for obtaining a differential measurement.

23. (New) A system for detecting the activity of a bio/chemical species in the presence of a reactive constituent, the system comprising:

a finite volume diffusion channel comprising a longitudinal transport axis, a first measurement probe positioned at a first location along the longitudinal transport axis, and a second measurement probe positioned at a second location along the longitudinal transport axis;

a reactive constituent deposited in the finite volume diffusion channel at a stationary position between the first measurement probe and the second measurement probe, wherein the reactive constituent is positioned to be in fluid communication with a supplied bio/chemical species along the longitudinal transport axis and is known or suspected of being reactive to the supplied bio/chemical species;

means for obtaining a differential measurement between the first and second measurement probes, wherein said obtained differential measurement corresponds to a diffusion response occurring between the bio/chemical species and the reactive constituent along the transport axis and between the first and second measurement probes, said obtained diffusion response indicative of the rate of activity of the bio/chemical species in the presence of the reactive constituent; and

means for correlating said obtained differential measurement to a predefined differential measurement corresponding to a baseline diffusion response to determine the rate of of activity of the bio/chemical species in the presence of the reactive constituent.

24. (New) The system of claim 23, wherein the finite volume diffusion channel comprises a micro-fluidic channel.

25. (New) The system of claim 24, wherein the microfluidic channel is formed within an integrated circuit.

26. (New) The system of claim 23, wherein the means for obtaining a differential measurement is selected from the group consisting of electrical means and optical means.

27. (New) The system of claim 23, wherein the system is constructed as system selected from the group consisting of a micro-electromechanical (MEM) system and a microfluidic system.

28. (New) The system of claim 23, wherein the finite volume diffusion channel includes a cavity operable to retain the reactive constituent.

29. (New) The system of claim 23, wherein the reactive constituent comprises beads.

30. (New) The system of claim 23, wherein the finite volume diffusion channel comprises a plurality of cavities for retaining a respective plurality of reactive constituents.

31. (New) The system of claim 23, wherein the finite volume diffusion channel is integrated with the means for obtaining a differential measurement.